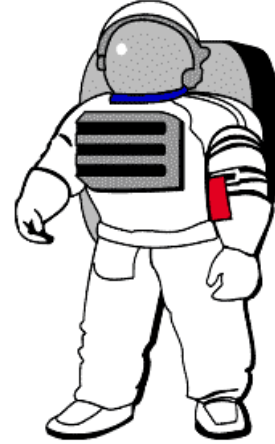


# Careers in the Space Industry

## So You Want to Work in the Space Industry ?

When asked the question, “What is a career in space?” many would answer “astronaut” or “astronomer” and there the list would end.



### But what else is there?

The space industry is actually a very broad and diverse field, involving participants ranging from a variety of science and engineering streams, to farming, manufacturing, and computer technology. One could even say that the space industry is really a combination of these fields.

In considering a career in space, the first thing you should be aware of is that the majority of careers take place here on the ground; only a relatively small number of people actually get the opportunity to leave the Earth for the limitless boundaries of space.

You should also keep in mind, however, that for each astronaut who makes it to space, there are literally thousands of support people on the ground without whose skills, knowledge and efforts, the mission would not have been possible.

### Career – Astronaut

In any discussion regarding careers in space, the career “astronaut” is always a popular topic.

The Canadian Space Agency, the sole employer of the Canadian astronauts, currently maintains an astronaut corps of seven individuals with backgrounds stemming from the military, engineering, medicine, and physics. They are:



Marc Garneau

Steve MacLean

Robert Thirsk

Dave Williams

Chris Hadfield

Julie Payette

Bjarni Tryggvason

In Canada, astronauts are categorized as either **Payload Specialists** or **Mission Specialists**; they are not trained to become Space Shuttle Pilots.

**Payload Specialists** are astronauts whose major responsibility is to conduct experiments on board the Space Shuttle or the International Space Station. They receive intensive scientific training as well as basic training in the operation of orbiter systems.

**Mission Specialists** are astronauts who also operate experiment apparatus, but are particularly responsible for the operation of orbiter systems during space flight. They learn to manipulate the CANADARM in space, and are trained in the area of Extra-Vehicular Activity (EVA), or *spacewalk*.

An advanced university degree in science, medicine and engineering or mathematics is an essential requirement to becoming a Canadian astronaut, along with a minimum of three years of related professional experience in the field.

Canada's astronauts undertake experiments on behalf of researchers in Canada and around the world, encouraging and supporting the development of scientific and technological programs in space. The Canadian Space Agency, Canada's authority on space, is responsible for the peaceful application of these programs and their development on Earth.

Astronauts also participate in many public events. Speaking and presentation skills are a necessity. The ability to communicate in both official languages is also important, as is a demonstrated concern for others through participation in community activities. Astronauts must be proven team players. They must show qualities of leadership, resourcefulness and the ability to function under stress. They must pass aircrew medical examinations and undertake a rigorous training, therefore physical condition is also an important consideration.

## ***The Space Industry Is...***

The following list was taken from the 1998 edition of *The Space Publication's Guide to Space Careers* (ISBN 1-887022-05-8), written by Scott Sacknoff and Leonard David. It provides general information on the wide variety of fields available in the space industry. Although this list is a great resource to help you determine which fields of work you are perhaps better suited for, it should not be taken as a complete list of careers in space.

### **TELECOMMUNICATIONS**

Using spacecraft to relay data from one part of the Earth to another.

- |                                  |                                      |                                    |
|----------------------------------|--------------------------------------|------------------------------------|
| ★ cable programming distribution | VSAT private                         | ★                                  |
| ★ international telephony        | ★ direct-to-consumer video and radio | ★ transmission mobile and wireless |
| ★ messaging services             | ★                                    | ★                                  |

### **SPACECRAFT MANUFACTURING**

- |   |            |                      |
|---|------------|----------------------|
| ★ | ★          | ★ weather satellites |
| ★ | satellites |                      |

## LAUNCH VEHICLES

Rockets which are used to place payloads in orbit.

- ★ expendable launch vehicles
- ★ space shuttle operations
- ★ reusable launch vehicles

## GROUND EQUIPMENT

The equipment on Earth which is used to receive and/or transmit data to and from spacecraft.

- ★ ground stations
- ★ antennas
- ★ electronic receiving and transmission equipment
- ★ computer software and hardware
- ★ high capacity data storage
- ★ information technology

## GROUND OPERATIONS

Facility design, development, and use; monitoring and controlling spacecraft or launch vehicles.

- ★ satellite operations
- ★ health monitoring software
- ★ operations planning software
- ★ component test facilities
- ★ launch vehicle spaceports
- ★ telemetry/control hardware and software

## GLOBAL POSITIONING SYSTEM SERVICES

The use of a 24-hour satellite system developed by the U.S. military that provides accurate positioning data anywhere on Earth.

- ★ enhanced air traffic control
- ★ improved search and rescue devices
- ★ directional services for cars

## REMOTE SENSING

The monitoring of the Earth using space-based sensors.

- ★ weather prediction and forecasting
- ★ use of digital terrain maps
- ★ searching for natural resources
- ★ analysis of soil and land conditions
- ★ monitoring of the Earth's environment
- ★ national security and intelligence gathering

## HUMAN SPACE ACTIVITIES

Activities related to the human exploration of space and the effects of long and short-duration spaceflight on the human condition.

- ★ International Space Station
- ★ psychological research
- ★ medical and physiological research
- ★ Space Shuttle

## MICROGRAVITY

Use of the special environmental conditions of space, such as low temperature and low gravity, to develop materials or products.

- ★ production of new/improved materials
- ★ biomedical drug development
- ★ enhanced crystals for biomedical research

## SPACE SCIENCE

The study of the universe including stars, planets, interstellar materials as well as the effect of the space environment on the Earth.

- ★ astrophysics and astronomy
- ★ cosmology
- ★ astrobiology
- ★ astrodynamics

## TECHNOLOGY RESEARCH AND DEVELOPMENT

A number of technologies are used in various aspects of the industry.

- ★ optics
- ★ thermal control
- ★ high-temperature materials
- ★ robotics
- ★ propulsion systems
- ★ guidance, navigation and control
- ★ power systems
- ★ lasers
- ★ composite materials

## SUPPORT SERVICES

- ★ administrative support
- ★ legal and licensing
- ★ media and publishing
- ★ satellite, launch vehicle and in-orbit insurance
- ★ technical support
- ★ financial services

## What Can I Do Now?

There are numerous things that you can do right now to diversify your interests and abilities in order to get you on the career path of your choice. Consider the followings:

- volunteer in the community;
- choose courses and projects carefully;
- be a student leader for a club or a sports team;
- diversify your interests (i.e. music, sports, arts);
- join a co-op program;
- look at Canadian universities who offers space science courses;
- start files on careers you find interesting;
- do “information interviews”;
- research interesting companies and career fields on the Internet;
- attend career fairs;
- take advantage of your career resource centre;

and last but not least, **ask questions!** If there is a career in the space sector that you find interesting, ask someone about it.

Your career resource centre staff will have all kinds of information for you about how to approach an employer and properly ask about her/his field or career. Although most companies have someone who is willing to speak to an inquisitive student, the manner in which you present yourself (whether it be by phone or in person) is extremely important. So make sure you’ve done your homework on the company you’ve chosen to approach, and be confident, be pleasant, learn everything you can, and most importantly, have fun!

The Canadian Space Agency is dedicated to promoting the peaceful use and development of space for the social and economic benefit of all Canadians. Please don’t forget to visit its website at <http://www.space.gc.ca>.

